Postdoctoral Researcher position:
Quantum simulation of molecular properties.

We invite applications for a two (2) year postdoctoral research position in the field of quantum simulation of molecular properties, to begin in Autumn 2018 (exact start date negotiable).

The successful applicant will join a collaboration between Lucas Visscher (VU Amsterdam, theoretical chemistry), Detlef Hohl (Shell, computational and applied mathematics), Francesco Buda (Leiden, theoretical chemistry), and Thomas O'Brien (Leiden, quantum information theory). The goal of this collaboration is to develop and optimize methods for accurate determination of molecular properties on a quantum computer, and to determine target molecules for potential quantum simulation by the first generation of commercial quantum computers. This will run alongside a parallel project to optimize the simulation of small molecules on current prototype quantum computers in the groups of Leonardo DiCarlo (QuTech - Delft, superconducting qubit experiment) and Lieven Vandersypen (QuTech - Delft, quantum dot experiment), and industry partners in Intel and TNO.

The first stage in this project will be to develop small molecular benchmarks to test the performance of quantum hardware in theoretical chemistry. From here, the project will proceed to developing hybrid quantum-classical techniques to study molecular properties beyond the ground state energy landscape. As part of this, a catalogue of target molecules and chemistry problems beyond the ability of traditional computational methods will be developed, for future study on a first commercial quantum computer.

Applicants should have a strong background in either quantum chemistry or computational physics. Previous knowledge of chemistry is essential, some knowledge of quantum information would be preferred. Applicants must have or be near completion of a PhD in an appropriate field.

Applications may be sent to obrien@lorentz.leidenuniv.nl . The position will remain open until a suitable candidate is found.